

BULLETIN

of THE NEW YORK CITY SOCIETY
OF HEALTH-SYSTEM PHARMACISTS



Incoming President's Message	1
<i>Jason Babby, Pharm.D., BCPS, NYCSHP President</i>	
Outgoing President's Message	3
<i>Yi Guo, Pharm.D., NYCSHP Immediate Past-President</i>	
Pregabalin vs. Gabapentin in the Management of Diabetic Neuropathy.....	5
<i>Talin Mehranian, Pharm.D. Candidate 2017</i>	
Mandatory E-Prescribing in NYS.....	7
<i>Dipa Ganatra, Pharm.D.</i>	
Sepsis: New Sepsis Criteria and Diagnostic Tools.....	9
<i>Christopher Milan, Pharm.D. Candidate 2017</i>	
Photo Gallery.....	13



Incoming President's Message

NYCSHP INSTALLATION ADDRESS 2016

Jason Babby, Pharm.D., BCPS

Pharmacy Without Borders

It truly is a humbling experience to be here with you today and be installed as the President of the NYC

Chapter of the New York State Council of Health-System Pharmacists. A journey like this is not made alone. So, I would like to thank my friends, peers, mentors, work colleagues, and family for being there with me and for me. Your opinions, accomplishments, friendships, and support have truly been an inspiration!

While I was a student on rotations, a faculty member (Dr. Mary Choy) invited me to an NYCSHP CE program. At first I thought, "Should I go?" I knew everyone attending the program would be a pharmacist and I would not know anyone there (except for Mary). I eventually decided to go to the program—it was at a great Italian restaurant and as a student, how could I pass up a free meal? During the CE, I met Manny Palermo, the president and Leila Tibi-Scherl, the president-elect of the society at the time. Little did I know that going to the program would have such an impact on my life. They invited me to the August "Pass the Gavel" meeting, which was the first Board of Directors meeting I ever attended. As a student that year, I became the Chair of Public Relations and created the first NYCSHP Facebook page. Fast-forward two years later (I was in New Jersey for two years completing my PGY-1 and PGY-2) and I'm sitting in Ted Friedman's office interviewing for a Drug Information Coordinator position at The Mount Sinai Hospital. We started discussing organization involvement and he asked me "When are you going to be President of NYCSHP?" I looked at him with a shocked face and told him that I first have to get involved again. And that's exactly what I did! In the years that followed, I was a member of the Clinical Pharmacy Subcommittee, Installation Committee, and Resolutions

Committee. I also served as a delegate, Director-At-Large, and President-Elect. That brings us to today and I am so excited and honored for the opportunity to serve as the President of NYCSHP!

The role of our profession is changing rapidly through Collaborative Drug Therapy Management (CDTM) and the ASHP Practice Advancement Initiative (PAI). PAI, formerly known as the Pharmacy Practice Model Initiative (PPMI), aspires to transform how pharmacists care for patients by empowering the pharmacy team to take responsibility for medication-use outcomes. It aims to do this by integrating pharmacists into health care teams, leveraging the skills of pharmacy technicians, promoting pharmacist credentialing and training, encouraging the appropriate use of medication-safety technology, and ensuring pharmacists are leaders in medication use. During my term as the NYCSHP President, I would like to promote and encourage any initiatives aimed towards further enhancing the CDTM and PAI objectives.

One of the goals of our profession is to obtain provider status. Acknowledging pharmacists as providers in the Social Security Act reinforces the value that pharmacists bring to health care teams in emerging health care delivery models, including Accountable Care Organizations. Achieving provider status for pharmacists will make it easier for patients to have access to pharmacist-provided patient care services by specifically referencing pharmacists as providers, as well as recognizing the value they bring to the health care team. The Pharmacy and Medically Underserved Areas Enhancement Act is a bipartisan legislation that will amend one of the sections of the Social Security Act to include pharmacists on the list of recognized health care providers. Currently, there are 18 cosponsors and 11

non-cosponsors in New York. We have to continue to advocate for provider status until we have 29 cosponsors of this act in New York.

Every day, pharmacists make decisions that affect the way they think, live, interact, and learn. We must take the initiative. Leaders make decisions, provide direction, develop plans, guide and nurture themselves and others, seek opportunities, and make choices. In the truest sense of the word, each of us sitting here is a leader, and everyone, at some point, exhibits leadership. Thomas Moore, explains *“Soul’ is not a thing, but a quality or dimension of experiencing life and ourselves. It has to do with depth, value, relatedness, heart, and personal substance. I do not use the word here as an object of religious belief or as something to do with immortality.”* I believe that in order for pharmacy to fully advance, we all must have “depth, value, relatedness, heart, and personal substance.” Pharmacists should be integral to and active participants on every health care team. All these national initiatives (CDTM, PAI, and provider status) help us practice at “the top of our license.” We all have to do our part to make this vision a reality.

Several members have asked me, “What vision do you have for this society?” I reflected on some of my favorite quotes in the past few months, and it was Albus Dumbledore that spoke to my heart. *“It is our choices that show what we truly are, far more than our abilities.”* What we do with the opportunities presented to us determines what kind of people we are. This led me to

my vision for this year. Pharmacy without borders. One of my goals is not only to continue the tradition of local community service, but to expand it by having members of our chapter participate in a Medical Mission. I also aim to start a mentoring program with local high schools. We mentor pharmacy students and pharmacists, but it’s time to get out of our bubble and mentor others. I’ve counseled several patients in the hospital who never knew there were pharmacists working in an institutional setting. We definitely need to become more visible and there is certainly a dire need to advertise our profession, expertise, and quality of care that we offer to our patients. By mentoring others outside the pharmacy field, we will not only be able to make a difference in their lives, but also promote our role in advancing health care. Lastly, I would also like to transform the Resident Collaborative Committee into the New Practitioner Committee. Transforming the committee to include all new practitioners will show our dedication to providing them with key resources they need to succeed—networking opportunities, volunteering opportunities, and leadership roles that can help them grow personally and professionally.

I look forward to beginning my term as the NYCSHP President and bringing down borders to further expand our profession. I hope to see all of you actively engaged in our events in the coming academic year. The “Pass the Gavel” meeting will be in August, so I charge all of you to invite someone to come along to the meeting. You never know, the person you invite may become the next president of NYCSHP! Thank you!



Outgoing President's Message

NYCSHP INSTALLATION ADDRESS 2016

Yi Guo, Pharm.D.

Good evening everyone! What a wonderful celebration! I still vividly remember the moment I stood right here on the same stage being sworn in as the president of the New York City Society of Health-System Pharmacists (NYCSHP) a year ago. That's the moment which I will always treasure. I am extremely honored and grateful to have been given the opportunity to serve you all as the president of NYCSHP for the past 12 months. First, I would like to thank our installation committee (Zane Last, Alla Khaytin, George Bugayenko and Sasha Libman) for organizing this amazing event. And also I would like to thank each and every one of you for being here this evening and for your continuous support!

It has been an exciting and fun journey for me to work with our board of directors, committee chairs, and members throughout the year. I have grown on both a professional and a personal level and I have learned so much from each one of you. As your outgoing president, I reflect upon the monthly continuing education (CE) programs, networking programs, discussions at board of directors meetings, and all the accomplishments of our chapter—I want to say that I am so proud of all of you!

This past year, one of my goals for our chapter was to collaborate, network, and deepen the relationships with our neighboring chapters to strengthen the bond in our pharmacy community. Our chapter launched several events for the very first time! Last fall, NYCSHP initiated our first networking dinner program with the Royal Counties chapter in Little Italy, NY and the first CE dinner program with the Westchester chapter at Montefiore Medical Center, Bronx, NY. Members, including residents and students, from all different chapters were able to come together and bring the

pharmacy community closer. We received such great feedback from each chapter, that subsequently

NYCSHP initiated and collaborated four more networking dinner programs with other chapters throughout the year! Moreover, we also kicked off our very first hiking trip at Breakneck Ridge with spectacular views over the Hudson River led by our director-at-large Zane Last. Members, friends, and families from the Royal Counties, Long Island, and Westchester chapters joined this outing as well. What a fun way it was to connect with each other outside of our traditional programs!

The other goal of our chapter was to support collaborative drug therapy management (CDTM) expansion bills and engage the technicians more. We launched our first letter writing/emailing session to our legislators to support the CDTM expansion bills during our CE dinner program with Monica Mehta. This was extremely helpful because we were able to engage our members to be more hands on through real time action together. This action embraced and strengthened the bond between members within our chapters. Last month, NYCSHP also sent out our first technician survey to help us identify the areas of improvement on how to support our technicians better as a local chapter. The results of this survey will provide us insight on how we can design our CE/networking programs to tailor them more toward technicians. So far, we have had more than 120 technicians from different healthcare systems



who have completed the survey. I would like to take this opportunity to thank all of you who helped facilitate this.

Our chapter has done lots and lots of great things throughout the year! What I mentioned above are only a few highlights in addition to our annual beautification of Adopt-a-Highway, painting walls at schools in the Bronx, advocating for pharmacists on the Today Show, AIDS Walk, etc. The list keeps going on and on! Many people came to me and told me that the New York City chapter is the chapter that has the most number of events throughout the year. The bar and expectations are raised higher every year, and NYCSHP has become a leading chapter! And I know this is because I have a group of brilliant board of directors and committee chairs who do the extraordinary work!

NYCSHP is a chapter with lots of fun, energy, and new ideas! There are so many people who played a role in the success of this year. I would like to thank our board of directors and committee chairs for their continuous support! Amisha Leimbach, Jason Babby, Michele Kaufman, Marie DiMicco, Karen Berger, Charrai Byrd, Zane Last, Alla Khaytin, Sasha Libman, Maabo Kludze-Forson, Eva Berrios-Colon, Kanika Ballani, Elsie Wong, Jamie Chin, and Loriel Solodokin: amazing team work—without your dedication and contribution, our chapter would not be the same! I'm so proud and thankful for what we have achieved. To our past presidents, Mary Choy, Liz Cobb, and Leila Tibi-Scherl: thank you for your

commitment to the city chapter and just simply being around! To our state council liaisons of the city chapter, Joe Pinto, Monica Mehta, and Philip Manning: thank you for sharing your wisdom and insight with us. It's always great to see your faces at our monthly board of directors meetings and CE/networking programs!

To my Montefiore family, Mark Sinnett and Frank Sosnowski: thank you for your guidance and for nurturing me to become a better clinician and leader each day and I have learned so much from both of you! Philip Chung, Belinda Ostrowsky, and Priya Nori: you make work so much fun with our antimicrobial stewardship program every day! I am extremely blessed to work with all of you. Finally, to my dear family and my husband Derrick Chen, thank you for all the love and support during this very busy year!

As we move forward with two strong NYCSHP presidents ahead of us, Jason Babby and Karen Berger, I am confident that our chapter is in good hands. Jason Babby, I have no doubt that great things will continue to happen with NYCSHP under your leadership. And with Joe Pinto as our new state president, we have a state leader deeply committed to advance our pharmacy profession. As I turn the corner and transition to my new role as immediate past-president, I pledge my ongoing support and dedication to NYCSHP! I am looking forward to a wonderful year ahead and thank you for an amazing year!





Pregabalin vs. Gabapentin in the Management of Diabetic Neuropathy

Talin Mehranian, Pharm.D. Candidate 2017, Touro College of Pharmacy

Preceptor: Deborah Wittman, Pharm.D., BCACP

Background

Peripheral neuropathy is found in about 2.4% of the population and in up to 8% in the elderly population.¹ Diabetic neuropathy is a common type of peripheral neuropathy and microvascular complication of diabetes. It is estimated to affect 50% of those diagnosed, but not everyone with neuropathy has symptoms. The risk of developing neuropathy increases with age. The highest rates of neuropathy are among those who have had the disease for at least 25 years. It is most commonly seen in patients with hyperglycemia, hypertension, obesity, and are over the age of 40.¹ Timely recognition of this microvascular complication of diabetes and tighter control of blood glucose are essential in delaying the progression of the disease. The purpose of this summary is to provide information about the differences in two of the most common oral agents, pregabalin (Lyrica®) and gabapentin (Neurontin®), in the management of diabetic neuropathy.

Definition

Diabetic neuropathy is a medical term describing nervous system destruction due to diabetes. Uncontrolled hyperglycemia for many years damages the coating of nerves and blood vessels, which are responsible to supply nerve cells with oxygen. As a result, the damaged nerves fail or incorrectly signal the messages received. The most common form of this complication is peripheral neuropathy, which affects the arms and legs. Symptoms of diabetic neuropathy include: pain, burning, tingling, or loss of feeling.^{1,2}

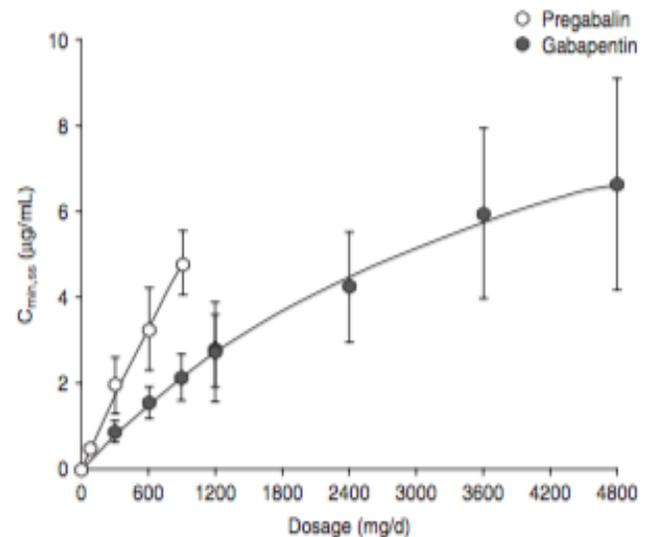
Pharmacokinetics & Pharmacodynamics of Pregabalin vs. Gabapentin

Finding the best pharmacological choice for diabetic neuropathy could be challenging due to the limited number of head-to-head clinical trials comparing the most commonly prescribed agents, pregabalin and gabapentin.³ Currently, pregabalin has an FDA-labeled indication for diabetic peripheral neuropathy-neuropathic pain while gabapentin is used as an off-label agent for the same indication. These two agents are antiepileptic medications that share a similar mechanism of action—they inhibit calcium influx and subsequent release of excitatory neurotransmitters. However, they differ in pharmacokinetic and pharmacodynamic characteristics.^{3,4}

The major PK difference between gabapentin and pregabalin is their extent of absorption from the GI tract. The absolute bioavailability of gabapentin drops from 60% to 33% when the dose is increased from 900 to 3600 mg/day; however, the dose increase from 75 to 900 mg/day does not affect the pregabalin absolute bioavailability of $\geq 90\%$ ⁵. This could be secondary to the additional systems available for the absorption of pregabalin. For instance, gabapentin is absorbed only via the small intestine, while pregabalin is absorbed throughout the small intestine and ascending colon.³ In healthy individuals, gabapentin is absorbed slowly and maximum concentration is reached within 3-4 hours. In contrast, pregabalin is rapidly absorbed, with peak blood concentrations reaching within 1 hour. Additionally, gabapentin has saturable absorption with a nonlinear (zero-order) process. On the other hand, pregabalin has a linear (first order) process with plasma concentrations increasing proportionally with increasing doses. In 33 healthy individuals, pregabalin showed linear pharmacokinetics for the recommended dose range and plasma concentration increased proportionally with increased dose. In contrast, gabapentin was observed in 96 healthy subjects and showed saturable absorption at higher doses (Fig 1).⁶

Both agents have dose-dependent relationships in the management of neuropathic pain. Reduction of pain is increased with higher doses of both agents; however, gabapentin does not show the same efficacy at doses greater than 1800 mg/day. Despite this similarity observed, differences were found between pregabalin and gabapentin using data from six phase III studies (two gabapentin and four pregabalin trials), which described the relationship between daily gabapentin or pregabalin administration and reduction of the neuropathic pain in the patients studied. Pregabalin was shown to be more efficacious in reducing pain with lower daily doses than gabapentin. Gabapentin demonstrated a plateau effect in the maximum daily dose and not much difference in regard to pain reduction in doses greater than 1800 mg/day. Pregabalin had more pain reduction as doses increased to 600 mg/day. It was suggested by model predictions that same pain score reduction was seen with pregabalin 450 mg/day vs. maximum strength (3600 mg/day) of gabapentin (Fig 2)⁶.

Figure 1: Mean steady-state minimum plasma drug concentration values in healthy subjects given pregabalin or gabapentin every 8h⁶



Latest Clinical Implications for the Management of Neuropathic Pain

Pregabalin is a newer generation of gabapentinoid, which was approved for neuropathic pain management in 2004 within the United States and Europe. Currently, gabapentin and pregabalin are the most commonly prescribed agents and considered first-line agents for the management of diabetic neuropathy. There have been some observational studies that recommend pregabalin over gabapentin. A *post hoc* analysis of two multicenter, prospective, 12-week studies compared pregabalin with gabapentin in patients with diabetic neuropathy and showed patients on pregabalin had greater pain reduction and higher number of responders. In addition, health care costs were reduced when pregabalin was used and more patients treated with pregabalin reached therapeutic dose levels than those treated with gabapentin. Due to a lack of head-to-head trials, it is not clear if there is any difference between pregabalin and gabapentin in regard to adverse effects⁶.

In a prospective study, the substitution of pregabalin in patients on gabapentin for neuropathic pain was associated with improved pain relief and fewer or no adverse effects. Compared with gabapentin continuous group, improvements of neuropathic pain were achieved in gabapentin responder and non-responders after pregabalin use. Patients with very good clinical responses to gabapentin had fewer benefits from substitution of pregabalin. As a result, pregabalin replacement for gabapentin should be considered in patients who do not respond very well to gabapentin. Patients who had adverse events or did not tolerate gabapentin also had more adverse events with pregabalin. Gabapentin responders did not present with any acute adverse events after substitution with pregabalin, but it was present in a minority of gabapentin non-responders. Pregabalin was generally associated with more tolerable adverse effects in gabapentin responders, but intolerable or even caused discontinuation in patients who were gabapentin non-responders.⁷

One of the major issues with gabapentin among physicians is underdosing. Prescribing gabapentin below recommended dosing causes inappropriate pain reduction and misconception of medication failure. However, prescribers need to keep in mind the nonlinear pharmacokinetics of gabapentin, which contributes to difficulties with titration of drug to higher doses with minimal adverse effects⁷. Due to pregabalin's desirable pharmacokinetic profile, providers may be more inclined to prescribe it.

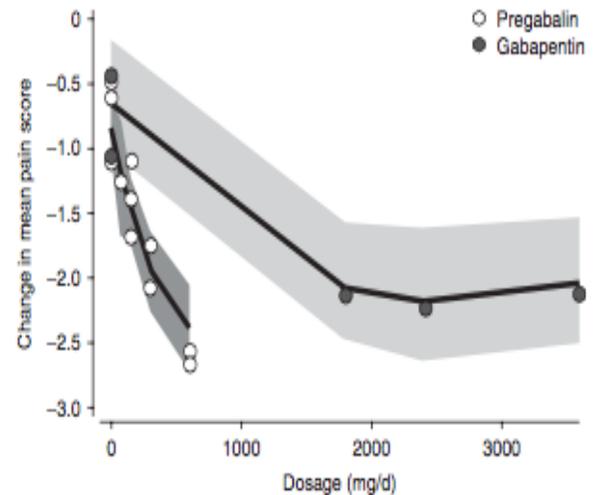
Conclusion

Pregabalin exhibits linear pharmacokinetics due to non-saturable absorption at clinically appropriate dosages. Additionally, pregabalin has a steeper dose-response curve without turning into a plateau curve at higher doses, which makes it efficacious for reducing the pain level. In contrast, gabapentin has saturable absorption along with reduction of pain relief at doses higher than 1800 mg/day. Switching gabapentin to pregabalin can be a reasonable option for those patients who do not tolerate or respond to maximum doses of gabapentin. Patients responding well to gabapentin may not have any benefit after switching to pregabalin. However, it should be noted that cost may play a role in medication selection as pregabalin is much more expensive and has third-party restrictions as compared to gabapentin. The comparison of pharmacokinetic and pharmacodynamics properties of pregabalin and gabapentin can serve as an aid for clinicians in choosing the appropriate agent and dose for the management of neuropathic pain.

References

1. Diabetic neuropathies: The nerve damage of diabetes. Available at: <http://www.niddk.nih.gov/health-information/health-topics/Diabetes/diabetic-neuropathies-nerve-damage-diabetes/Pages/diabetic-neuropathies-nerve-damage.aspx>. Accessed April 25, 2016.
2. Prevent Complications | Managing | Diabetes | CDC. Available at: <http://www.cdc.gov/diabetes/managing/problems.html>. Accessed April 25, 2016.
3. How gabapentin differs from pregabalin. Available at: <http://www.pharmacytimes.com/contributor/jeffrey-fudin/2015/09/how-gabapentin-differs-from-pregabalin>. Accessed April 25, 2016.
4. Toth C. Substitution of gabapentin therapy with pregabalin therapy in neuropathic pain due to peripheral neuropathy. *Pain Med.* 2010; 11(3):456-465.
5. Pruskowski J, Arnold R. A comparison of pregabalin and gabapentin in palliative care #289. *J Palliat Med.* 2015; 18(4):386-387.
6. Toth C. Pregabalin: latest safety evidence and clinical implications for the management of neuropathic pain. *Ther Adv in Drug Saf.* 2013; 5(1):38-56.
7. Toth C. Substitution of gabapentin therapy with pregabalin therapy in neuropathic pain due to peripheral neuropathy. *Pain Med.* 20; 11(3):456-465.

Figure 2: Treatment effects of mean pain reduction in six trials with pregabalin and pregabalin involving patients with neuropathic pain⁶





Mandatory E-Prescribing in NYS

On March 27, 2016, legislation went into effect in NYS that required all prescriptions to be transmitted electronically. The new law requires electronic prescribing for all types of medications (controlled substances and non-controlled substances) and for syringes and other medical devices dispensed at a pharmacy in New York. New York is leading the nation in the enablement of Electronic Prescribing of Controlled Substances (EPCS). In New York, 27% of total prescribers are enabled to digitally prescribe controlled substances and 58% of prescribers are actively transmitting electronic prescriptions in general. Approximately 93% of New York pharmacies are now able to electronically receive prescriptions for controlled substances.^{1,2}

This legislation requires all physicians, physician assistants, dentists, nurse practitioners, optometrists, podiatrists and midwives to issue prescriptions electronically directly to a pharmacy, with limited exceptions.¹

Prescribers will not be required by law to issue a prescription electronically when:

- The prescriber has a waiver granted by the New York State Commissioner of Health;¹
- The prescription will be dispensed at a pharmacy located outside New York State;¹
- Electronic prescribing is not available due to temporary electronic or technological failure;¹
- The prescriber reasonably determines that it would be impractical for the patient to obtain substances prescribed by electronic prescription in a timely manner.¹

Electronic prescribing (e-Rx) is the computer-based electronic generation, transmission and filling of a medical prescription taking the place of paper and faxed prescriptions. It outlines the ability to send accurate and understandable prescriptions electronically from the healthcare provider to the pharmacy. Electronic prescribing has the potential to minimize the medication errors for patients in New York State and across the nation. It also allows for the integration of prescription records directly into the patient's electronic medical record. Electronic prescribing has the potential to reduce prescription theft and forgery.

In order for electronic prescriptions to be issued, prescribers must obtain a number of government approvals and identification numbers and register their "certified electronic prescribing computer application."

The following is a summary of these requirements:

- **A Federal Drug Enforcement Administration Registration (DEA) Number.** It must be issued by the US Department of Justice- Drug Enforcement Administration. In New York, every prescription for a controlled substance issued by a prescriber must have a DEA number on it.³
- **A National Provider Identifier (NPI) issued by the US Center for Medicaid and Medicare Services (CMS).** Federal law requires health care providers (including hospitals and prescribers) to use NPIs on electronic health care transactions. CMS issues NPIs to licensed prescribers and institutional health care providers.³
- **Registration of “Certified” Electronic Prescribing Computer Applications.** The electronic prescribing computer applications that prescribers use must meet federal regulatory criteria for protecting the confidentiality and security of patient information.³
- **A Health Commerce System Account (HCSA) from the New York State Department of Health.** All prescribers must have a HCSA in order to access an online Prescription Monitoring Registry when prescribing controlled substances. In New York, all prescribers prescribing controlled substances must consult the registry, which contains information about prescription for controlled substances obtained by their patients.³
- **Registration with the New York State Department of Health’s Bureau of Narcotic Enforcement.** In order to prescribe controlled substances, each prescriber should be registered with the New York State Health Department’s Bureau of Narcotic Enforcement. The registration must be renewed every 2 years. Prescribers who do not prescribe controlled substances do not need to register as a prescriber of controlled substances with the New York State Department of Health’s Bureau of Narcotic Enforcement.³
- **A Medicaid Provider Number.** In order to prescribe for Medicaid beneficiaries, prescribers must obtain a Medicaid Provider Number. This can be obtained at www.emed.org.³

Under the new law, pharmacists can continue to dispense fax, oral or written prescriptions that are in accordance with NYS law. Pharmacists are not required to verify whether the practitioner has a waiver from the requirement to electronically prescribe or whether the prescriber falls under one of the other exceptions to electronically prescribe.³

For pharmacists, electronic prescribing improves workflow. By moving to a system of electronic prescribing, questions regarding clarification of illegible prescriptions will be significantly reduced and there will be fewer mistakes in the process of filling and dispensing. There will also be a decrease in the number of fraudulent/modified prescriptions written, such as those for opioids.

References

1. New York State Office of the Professions. Mandatory electronic prescribing. <http://www.op.nysed.gov/news/advisory-notices.html#electronic> . Accessed May 13, 2016.
2. Surescripts. New York leads in e-prescribing of controlled substances worldwide. <http://www.surescripts.com/news-center/press-releases/content/new-york-leads-in-e-prescribing-of-controlled-substances-nationwide>. Accessed May 13, 2016.
3. New York State Department of Health. Electronic prescribing of controlled substances- NYSDOH. <http://www.health.ny.gov/professionals/narcotic/>. Accessed May 13, 2016.

Sepsis: New Sepsis Criteria and Diagnostic Tools
 Christopher Milan, Pharm.D. Candidate 2017
 Touro College of Pharmacy
 Preceptor: Brandon Vachirasudlekha, Pharm.D.

Sepsis affects more than 1 million people each year in the United States. As many as 52% of in-hospital deaths may be attributable to sepsis.¹ Sepsis kills more patients than AIDS, breast cancer, and prostate cancer combined.² It can involve prolonged hospital stay, complex treatments, and increased healthcare costs. It has been a major medical challenge due to its unpredictability and rapid progression.³

The systemic inflammatory response syndrome (SIRS) criteria have been used to diagnose sepsis for more than 20 years (Table 1).⁴ However, SIRS can be very non-specific and may be seen in non-infectious processes such as prolonged strenuous exercise, trauma, and pancreatitis. The understanding of sepsis pathophysiology has evolved and now incorporates inflammatory and anti-inflammatory responses, coagulation, cardiovascular, autonomic, metabolic, and hormonal changes, which cause a dysregulated response to infection and lead to organ dysfunction.⁵ In February 2016, new definitions for sepsis and septic shock were published by a task force of the Society of Critical Care Medicine and European Society of Intensive Care Medicine to improve fast recognition and early treatment of sepsis and septic shock.⁶ The new Sepsis-3 definitions aim to increase accuracy and speed of diagnosis, shift focus from infection with systemic inflammation to infection-triggered organ dysfunction, simplify the definition of septic shock, and remove redundancies from previous definitions.⁷ The Sepsis Definitions Task Force redefines sepsis as life-threatening organ dysfunction caused by a dysregulated host response to infection.⁸ To clinically identify sepsis, organ dysfunction is recognized as an increase of 2 points or more in the Sequential Organ Failure Assessment (SOFA) score (Table 2).⁷ A large retrospective cohort analysis

Table 1: Adult SIRS Criteria	
The systemic inflammatory response syndrome requires 2 or more of the following:	
Temperature >38°C or <36°C	
Pulse ≥90 beats per minute	
Respirations ≥20 breaths/min or PaCO ₂ <32 mmHg	
WBC ≥12,000 cells/μl or ≤4000 cells/μl or immature neutrophils >10%	

From N Engl J Med. 2015; 372(17):1629-1638.

Table 2: Sequential [Sepsis-Related] Organ Failure Assessment Score

System	Score				
	0	1	2	3	4
Respiration: PaO ₂ /FIO ₂ , mmHg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation: Platelets, x10 ³ /μL	≥150	<150	<100	<50	<20
Liver: Bilirubin, mg/dL (μmol/L)	<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular	MAP ≥70mmHg	MAP <70mmHg	Dopamine <5 or dobutamine (any dose) ^b	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1 ^b	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^b
Central nervous system: Glasgow Coma Scale score ^c	15	13-14	10-12	6-9	<6
Renal: Creatinine, mg/dL (μmol/L) Urine Output, mL/d	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440) <500	>5.0 (440) <200

Abbreviations: FIO₂, fraction of inspired oxygen; MAP, mean arterial pressure; PaO₂, partial pressure of oxygen
^bCatecholamine doses are given as μg/kg/min for at least 1 hour.
^cGlasgow Coma Scale scores range from 3-15; higher score indicates better neurological function

From JAMA. 2016 Feb 23;315(8):801-10

demonstrated that in adult patients with suspected infections in intensive care units (ICUs), SOFA was significantly superior to SIRS for predicting hospital mortality (Table 3). In adult patients not admitted to ICUs, there were no significant

differences in sepsis recognition while comparing SOFA to SIRS (Table 3). Outside of the ICU setting, patients with a suspected infection likely to have a prolonged ICU stay or in-hospital death can be promptly identified at the bedside with the quick Sequential Organ Failure Assessment (qSOFA).⁹ The streamlined process of qSOFA is particularly useful for easy and rapid evaluation of patients with possible sepsis not admitted to ICUs since it only looks at three clinical variables: hypotension, altered mental status, and tachypnea (HAT) (Table 4). Importantly, laboratory tests are not required in qSOFA and it has a predictive validity similar to the full SOFA score in non-ICU patients (Table 3).⁷ If a patient meets 2 or more of the qSOFA criteria, it is recommended to closely monitor the patient, consider referral to critical care, and initiate or escalate treatment as needed.

The new clinical definition for septic shock, a critically-ill and high mortality subgroup, is sepsis with persistent hypotension requiring vasopressor therapy to maintain mean arterial blood pressure > 65mmHg and elevated serum lactate of > 2mmol/L despite adequate fluid resuscitation.¹⁰ With these new definitions, the term “severe sepsis” was deemed redundant and is no longer used (Table 5).

Table 3: Predictive Validity of SIRS, qSOFA and SOFA for Hospital Mortality

	AUROC	95% Confidence Interval
ICU Patients		
SIRS	0.64	0.62 – 0.66
qSOFA	0.66	0.64 – 0.66
SOFA	0.74	0.73 – 0.76
Non-ICU Patients		
SIRS	0.76	0.75 – 0.77
qSOFA	0.81	0.80 – 0.82
SOFA	0.79	0.78 – 0.80

(AUROC: area under the receiver operating characteristic curve)

From JAMA. 2016; 315(8):801-810.

As the understanding and treatment of sepsis evolves in today’s practice, the updated clinical definitions should assist in more accurate early recognition of life-threatening infections and expedite timely management of patients with sepsis or at risk of developing sepsis.¹¹ With qSOFA, all healthcare professionals can contribute in recognizing sepsis at the bedside and start early and appropriate interventions.

Table 4: Quick Sequential Organ Failure Assessment (qSOFA)

Patients with suspected infection who are likely to have a prolonged ICU stay or to die in the hospital are identified with 2 or more of the following:

- Systolic blood pressure of ≤ 100 mg
- Altered mental status
- Respiratory rate ≥ 22

From JAMA. 2016; 315(8):801-810.

Table 5: New Sepsis and Septic Shock Definitions

	PREVIOUS (2001)	NEW (2016)
Sepsis	Suspected infection + ≥ 2 SIRS criteria	Suspected infection + Δ SOFA ≥ 2 or qSOFA ≥ 2
Severe sepsis	Sepsis + Hypoperfusion or organ dysfunction	Category removed
Septic Shock	Severe sepsis + Hypotension not reversed with fluid resuscitation	Sepsis + Vasopressors to maintain Mean Arterial Pressure ≥ 65 + Serum lactate > 2 mmol/L

References:

1. Liu V, Escobar GJ, Greene JD, et al. Hospital deaths in patients with sepsis from 2 independent cohorts. *JAMA*. 2014; 312(1):90-92.
2. Wood KA, Angus DC. Pharmacoeconomic implications of new therapies in sepsis. *Pharmacoeconomics*. 2004; 22(14):895-906.
3. Rhee C, Gohil S, Klompas M. Regulatory mandates for sepsis care—reasons for caution. *N Engl J Med* 2014; 370:1673–6.
4. Kaukonen K-M, Bailey M, Pilcher D, et al. Systemic inflammatory response syndrome criteria in defining severe sepsis. *N Engl J Med*. 2015; 372(17):1629-1638.
5. Iskander KN, Osuchowski MF, Stearns-Kurosawa DJ, et al. Sepsis: multiple abnormalities, heterogeneous responses, and evolving understanding. *Physiol Rev*. 2013; 93(3):1247-1288.
6. Seymour CW, Liu VX, Iwashyna TJ, et al. Assessment of clinical criteria for sepsis: for the third international consensus definitions for sepsis and septic shock (Sepsis-3). *JAMA*. 2016; 315(8):762-774.
7. Vincent JL, Moreno R, Takala J, et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the working group on sepsis-related problems of the European Society of Intensive Care Medicine. In: Vol 22. 1996:707–710.
8. Singer M, Deutschman CS, Seymour C, et al. The third international consensus definitions for sepsis and septic shock (Sepsis-3). *JAMA*. 2016; 315(8):801-810.
9. Jacob JA. New sepsis diagnostic guidelines shift focus to organ dysfunction. *JAMA*. 2016; 315(8):739-740.
10. Shankar-Hari M, Phillips GS, Levy ML, et al. Developing a new definition and assessing new clinical criteria for septic shock: for the third international consensus definitions for sepsis and septic shock (Sepsis-3). *JAMA*. 2016; 315(8):775-787.
11. Abraham E. New definitions for sepsis and septic shock: continuing evolution but with much still to be done. *JAMA*. 2016; 315(8):757-759.

CALL FOR PAPERS

Have you wanted to publish, but never had a chance?

We are looking for articles in all areas of pharmacy practice!

Please submit your publications to the bulletin editors:

Sasha Libman alexandra11229@gmail.com

Alla Khaytin alla_melamed@yahoo.com

Brett Rollins brettmr@gmail.com



Mark Your Calendars for these Upcoming NYCSHP Events!

- September 8th: Networking Dinner Program
- September 15: Flu Clinic Volunteering
- September 24th: New Practitioner Committee Networking Event- Wine Riot
- September 28th: Industry Relations CE Program
- October 1st: Adopt-a-Highway
- October 17th: Today Show
- October 18th: Networking Dinner Program
- October 16th: New Practitioner Committee- Making Strides Against Breast Cancer Walk
- October 20th: CE Program
- October 22nd: New York Cares Day (Team NYCSHPharmacy)
- October 27th: CE Program
- October 29th: Hiking Trip
- November 6th: Medical Volunteering at NYC Marathon
- November 8th: CE Program
- November 8th: Student Program
- November 10th: Networking Dinner Program
- November 12th: Special Projects CE Program
- November 15: New Practitioner Committee- Leadership Program
- November 17th: CE Program
- December 13: CE Program

NYCSHP Board Members		Contact Information
President	Jason Babby	jason.babby@mountsinai.org
President-Elect	Karen Berger	kab9098@nyp.org
Immediate Past-President	Yi Guo	yiguo@montefiore.org
Secretary	Charrai Byrd	chb9050@nyp.org
Treasurer	Marie DiMicco	dimicco.marie@gmail.com
Directors-at-Large		
Constitution and Bylaws, Public Relations, Special Projects	Nikki Bhogal	nbhogal@chpnet.org
Student Relations, Legislative Affairs, Supportive Personnel	Maabo Kludze-Forson	mkludze@gnyha.org
Installation Dinner, Membership, Industry Relations	Zane Last	zlast@sbhny.org
Bulletin Editors		
	Sasha Libman	alexandra11229@gmail.com
	Alla Khaytin	alla_melamed@yahoo.com
	Brett Rollins	brettmr@gmail.com
Committee Chairs/Members		
Constitution and By-Laws	Amisha Leimbach (<i>Chair</i>), Tamara Yunusova, Kristin Linder, Sulema Barron, Kanika Ballani, Harshal Shukla, Alina Levitsky	
Public Relations	Kristin Linder (<i>Chair</i>), George Bugayenko, Khusbu Patel, Pinkal Patel, Karin Yamazaki, Andrew Smith, Grace E. Lee, Zachary Piracha, Tamara Yunusova, Kristin Linder, Tram Thai, William Olsufka	
Special Projects	Alina Levitsky (<i>Chair</i>), Tamara Yunusova, Daryl Paris, Denis Adamchuk, Tram Thai, William Olsufka, Kristin Linder	
Student Relations	Khusbu Patel, Julia Sessa, Stephen Farley, Hina Ghani, Zachary Piracha, Melissa Santibanez	
Legislative Affairs	Stephen Keelen	
Supportive Personnel	Marina Petratos	
Installation Program	Fawad Piracha, Hina Ghani, Zachary Piracha, Todd Larson, Sasha Libman	
Industry Relations	Colleen Kim, Fawad Piracha, Hina Ghani, Zach Piracha	
Grant Writing	Evangelina Berrios-Colon	
Social Media Coordinator	Elsie Wong	
Historian	Johnny Hon	
Community Outreach	George Bugayenko	
Global Health Initiative	Kanika Ballani	
Mentoring	Vickie Powell, Amber Johnson	
New Practitioner Committee	Harshal Shukla, Pavel Goriacko	
Membership	Yasmin Saafan, Karin Yamazaki, Liliana Argento, Monica Sorio, Sulema Barron, Zachary Piracha, Hina Ghani	
Liaisons		
State Liaisons	Monica Mehta, Joe Pinto, Leila Tibi-Scherl	
Faculty Liaisons	Mary Choy (Touro College of Pharmacy), Khusbu Patel (St. John's University), Antony Pham (Long Island University)	

June 2016: Residents' Collaborative Networking Event



June 8th, 2016: Board of Directors Appreciation Dinner





June 24th, 2016: NYCSHP's 51st Annual Installation Dinner





